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PRELIMINARY REPORT

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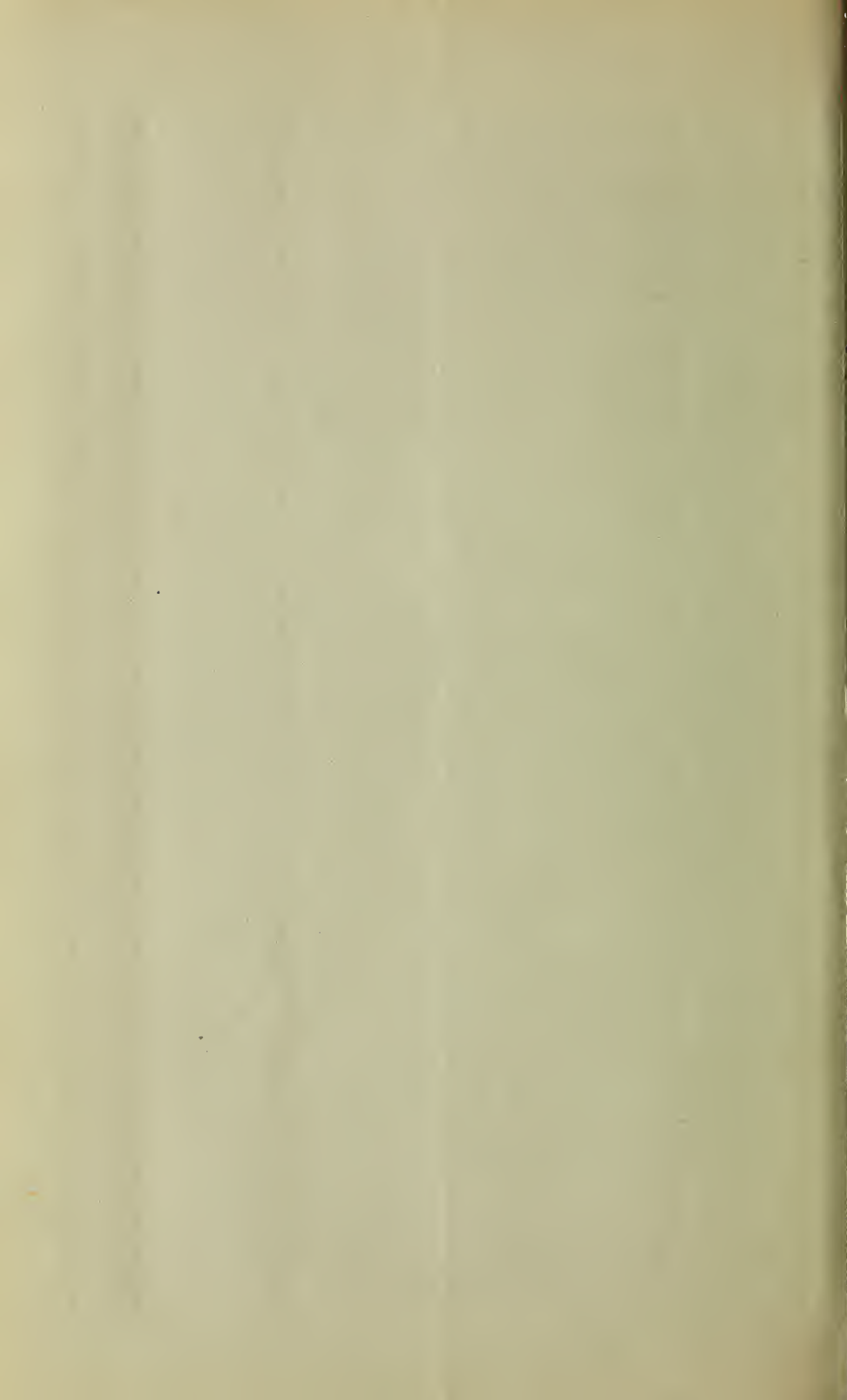
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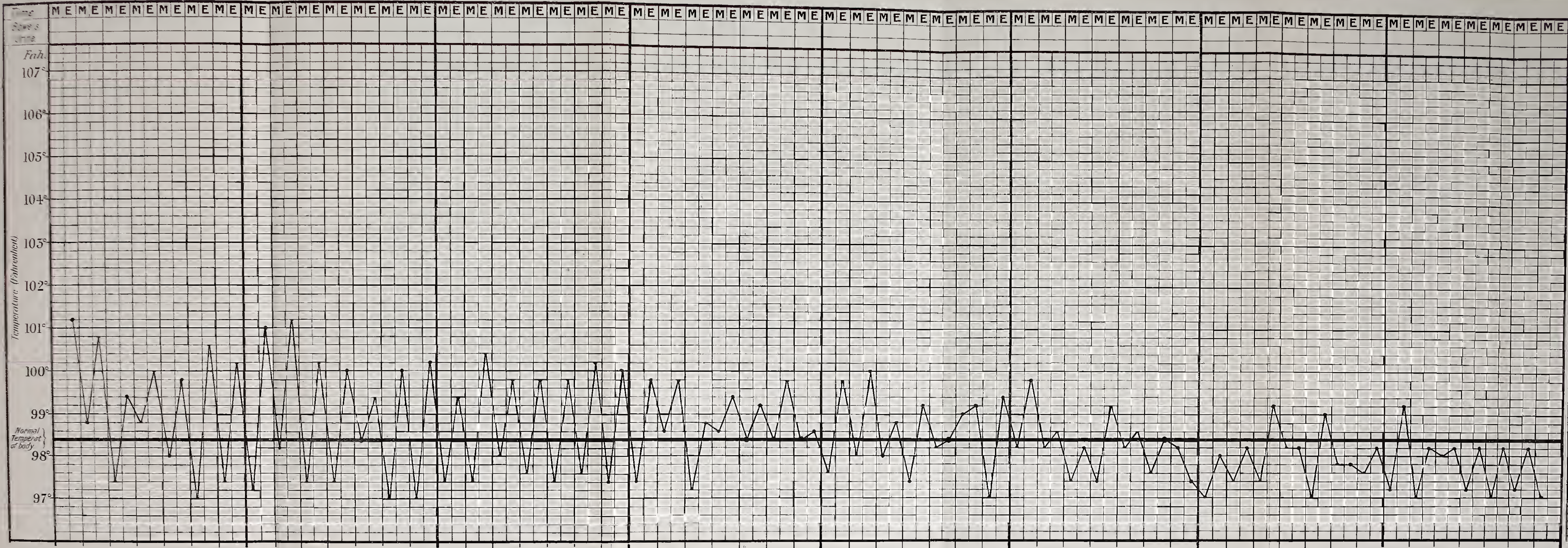
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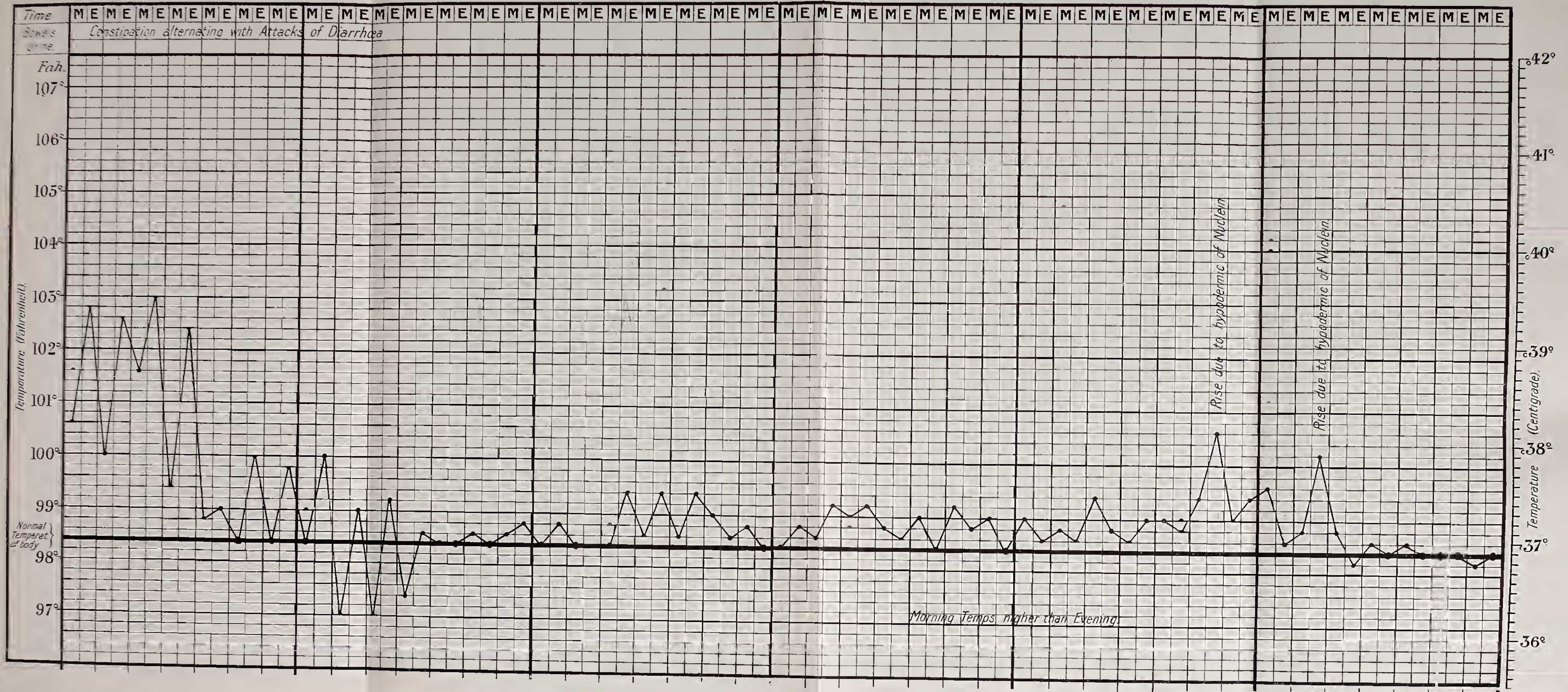
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DUNBLANE, N.B.

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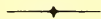








THE TREATMENT OF ADVANCED PULMONARY
TUBERCULOSIS BY INTRAVENOUS INJECTIONS OF IODOFORM, by THOMAS W.
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PRELIMINARY REPORT.

IN submitting this short preliminary report of an incompleting research on which I have been engaged for some time, I shall confine myself chiefly to a description of the method. The results obtained have been so striking that several of my medical friends, who have examined patients before treatment was begun and after, are of opinion that it warrants publication. All the patients treated have had tubercle bacilli cocci and elastic tissue in the sputum, and in all both lungs were affected. In every instance there has been a great and sometimes rapid improvement in physical signs, temperatures have become normal, weight and vigour increased, and expectoration and organisms diminished. This has been achieved in patients with cavitation, whose condition was regarded as practically hopeless by independent physicians of the highest repute. It was my original desire to publish completed accounts of a number of cases, with charts and diagrams, in which the "arrest" had stood the test of time, and to which the term "cure" could have been applied with some justice; to record others where it had only stayed the advance of the disease, and to admit the residuum in which it had exercised no beneficial

effect whatever. Such a report, accompanied by the independent certification of other medical men, will alone now carry conviction to the profession, should a claim be put forward that a cure has been found. This is necessary when we consider the pathology of the disease, its varied modes of dissemination (after implantation), the extreme range of age in which it is found, the frequent complexity of the infection, its latency and power of insidious advance. It of necessity follows that an analysis of even a hundred cases would be an imperfect gauge of any therapeutic measure. Here, in a country district, the number of phthisical patients is small, and as most of those who are in a position to leave the towns for treatment gravitate to the various sanatoria or health resorts, it would be a work of years before I was in a position to tabulate even such a small number.

The impossibility, therefore, of getting material on which to work will, I trust, extenuate the imperfections and shortcomings of premature publication. In the hospitals, sanatoria, and asylums, however, throughout the country there are patients in all stages of the disease under the care of experts with time and opportunity who can test the potentiality of the treatment. While fresh air is a desirable adjunct, I have recently treated one of my worst cases without it. In fact, the nurse had difficulty in getting even imperfect ventilation. There were disabilities in the case which I need not detail, but it is interesting to record that the fresh air treatment, as now practised, is not essential to the patient.

While all are awaiting the announcement from some research laboratory that an efficient and reliable antitoxin for tubercle has been obtained, it unfortunately happens that our patients are dying in the purest of air, stuffed with the most nutritious foods. It has been my lot (as it is the lot of most general practitioners) to have had to attend a good many patients suffering from advanced tubercular disease of the lungs. Some of these had wintered abroad, some been in sanatoria, others had neither of these advantages. All, how-

ever, had been under treatment of some kind or other, in the face of which the mischief had advanced with greater or less rapidity. The partial success which of late years has attended efforts at combating the mischief by direct attack *in situ* by way of the veins led me to make some experiments in that direction. In this search the much discussed Iodoform seemed to possess distinct qualifications. Despite the difference of opinion which exists as to its antiseptic qualities and how these are effected, and that it has a sickly penetrating odour most offensive to many, it is still one of the most trusted antiseptics with the operating surgeon.

In selecting it as the germicidal agent in an active attack on tubercle in the lung, there were many points in its favour—

- 1st. Its purity and known safety as an antiseptic agent.
- 2nd. Its ready elimination.
- 3rd. Its slow volatility, and therefore sustained action.
- 4th. It seems to have an affinity for dead or dying tissue, *i.e.* the situations where the trouble is most active.

Could it be conveyed to the lung capillaries and chiefly deposited there, it seemed reasonable to expect "*amelioration*" in the condition and possibly such an emphatic "*arrest*" that auto-immunization, increased tissue resistance, or whatever other forces ensure the occasional unaided recovery in advanced cases of this disease, might have their opportunity to act. To effect this it required to be in solution, and its great solubility in æther was taken advantage of. At first this seemed an ideal solvent (its disadvantages are noted later). The ætherial solution would be rapidly conveyed to the lung capillaries. There the æther might be expected to volatilise and leave some solid iodoform *in situ*. Having satisfied myself by injection that this solution was safe, the remedy was applied to several patients. What happens is as follows:—

The breath and mouth at once smell and taste of the

solution. Soon the æther is dissipated, but for several hours (depending on the dose) the breath smells of iodoform, and the patient is conscious of the smell and taste. This stability of iodoform after injection is very interesting and desirable. The liberation of free iodine to even a small extent would rapidly irritate the inner coating of the veins, assist in the production of thrombosis, besides causing severe coughing. Further, this persistence seems to point to the iodoform itself as iodoform exerting the beneficial influence rather than to the decomposition of the compound freeing pure iodine. I have repeatedly examined the urine with the starch test at varying intervals after injecting, but have failed to get the iodine reaction. On this point, however, I do not desire to be dogmatic.

This slow sustained action of the drug may therefore be counted upon, while at the same time its volatility diminishes the risk of a cumulative action. Patients soon become tolerant of the taste, and, unless the injections are pressed, I have met with no bad effects whatever while employing small doses. Pushing the drug in large daily doses positively seems to saturate the system. I have, after discontinuing it for several days, detected the smell in the palms of the hands and skin of the body. The patients are then so constantly conscious of it that the appetite is affected. It is undesirable and unnecessary to push the injections to this extent.

In the course of this work I have observed that soon after the injections are begun, evidence of disease is revealed sometimes where none was suspected at first. This diagnostic quality of the injections is valuable. The production of fine crepitations or râles at an apex formerly dry, resonant, and apparently healthy, is of importance. It proves how subtle the malady is, and how untrustworthy the most careful physical examination occasionally may be.

Briefly, then, these are the good points, but it has important drawbacks referable both to the æther and the iodoform. The chilling effects of the æther on the vein walls, diminishing their calibre and temporarily stiffening, if not partially

freezing them, has to be guarded against as much as possible. Further, in a case (five years' duration) with extensive cavitation in the upper lobes of both lungs and consolidation at both bases ant. with absence of breath sounds and little or no chest action, it occasioned such sudden, persistent breathlessness and palpitation that I had to discontinue treatment. As the patient could take the æther alone, without any discomfort, the natural conclusion is that the CHI_3 was the offending cause. This did not occur once but several times, and even with m v. injections. It is possible that this embarrassment may be found a constant characteristic and contraindication in very advanced disease where the margin of available lung tissue is only equal to continuing life under the most passive conditions. To save such cases is, of course, the dream of the physician, but we might reasonably expect that the paralysing influence which CHI_3 exerts on the motor-ganglia of the heart would be intensified when it has been debilitated by unduly rapid action and the wasting effects of toxines.

Before beginning the treatment of any case, we must first examine carefully the available superficial venous system both in the arms and legs. The more extensive this is, the greater is the probability that we shall "*arrest*" the progress of the disease. Therefore men are more favourable subjects for treatment than women, and women than children. (I have never had occasion to use it in children, and I fear, from their natural timidity, it would not be possible to carry it out.)

Nothing can be more disconcerting than a request to undertake the treatment of a plump or even fat young woman of eighteen or twenty with extensively diseased lungs, whose total available superficial venous system is represented by two dim blue areas half an inch long at the bends of the elbows. Yet this is no imaginary case.

It will demand the most scrupulous care and dexterity to administer injections regularly for six months or a year. While nothing is simpler than to give an intravenous injection

once in a large vessel, it is a matter of some difficulty to give a hundred, through a small restricted venous supply to avoid thrombosis, and have the vessels still patent at the end of a year.

Patients with advanced phthisis are either in bed, or on a sofa, or deck chair outside if the weather permits. The hands and upper extremities are exposed and cold, and the lumen of the veins small. In short, we come to the worst cases under the most disadvantageous conditions.

While not wishing to deter anyone from undertaking the treatment, I would suggest that the busy, hard-worked practitioner, with little time at his disposal, should not attempt it. Mistakes are exceedingly painful to the patient, and apt to discourage them. The successful injection is painless. Pain is an imperative indication to withdraw the needle at once, and not attempt it again in that particular vein for forty-eight hours at least. So far as possible, avoid using the same vein except at intervals. If the operator has no choice, try to avoid entering the needle exactly at the same spot.

It is almost unnecessary to add that the skin over the vein to be used is treated antiseptically. It is impossible to be too careful in cleaning and rendering aseptic the syringes and needles. The solubility of iodoform in æther is 1 in 7. The solution I used is not quite saturated. If a saturated solution is employed before the operator can get the needle into the vein, some of the æther has volatilised; the needle will be found blocked with iodoform and the plunger probably jammed, rendering injection impossible.

I begin generally with daily injections of from m v.–vii. The solution must be introduced very slowly. With large full veins and lungs not too much disorganised, it is possible to give very large doses. To two patients I have given m xlv., representing at least 6 grs. of pure iodoform. I do not think such large doses are necessary, and the long chilling of the vein with such a big injection is apt to prove permanently

injurious. *Every vessel that becomes occluded diminishes the patient's chance of recovery.*

The iodoform I employ is the finest precipitated that I can get, and the purest æther of sp. gr. .720. Inferior forms of iodoform and æther make a solution which rapidly decomposes and liberates iodine.

The solution should be made *fresh, if possible, for each patient immediately before the injection, and exposed to light as little as possible. Old solution should be thrown out.*

As would be expected, a large dose (m xx.-xxv.) is occasionally followed by temporary loss of consciousness, but if the earlier injections have been successful, neither patient nor friends will object when told it is likely to occur.

Space does not permit of my enclosing drawings of the apparatus I have devised to assist me, nor of my enumerating the little details of technique which I have found necessary. These can be better shown than described.

It has been my experience that the continuous successful injection of an ætherial solution of iodoform is followed *pari passu* by an improvement in the patient's condition in every way, and that, except in very advanced disease, it appears to be innocuous in moderate doses.

Subjoined, by way of illustration, are the charts of two patients. In one, the whole of the upper lobe of the R. lung was affected and a cavity existed. The L. apex was also the seat of disease. He has had a hundred injections at least. He is now well in every way. Coughs a very little in the morning. Sputum about 5 i. in twenty-four hours; sometimes less. Organisms still present in small numbers. L. apex is now clear, and the R. exhibits the signs of a cicatrized cavity. In the other, the whole of the R. lung was infiltrated and breaking down, and the L. apex had begun to give way. In this instance the patient has lived for years in the country under the best hygienic conditions, and the windows of the house have been open day and night all the year round. In spite of

this, the disease got implanted. The recovery here, too, is very remarkable; organisms can still be found.

The potentiality of the method seems great, and, should my experience be confirmed, it may enable many wage-earners to whom the sanatorium is not open to continue at work while gradually regaining better health. I have two patients at present so doing. That it is powerful to "*arrest*" I have no doubt, and, therefore, an agent of some importance in mitigating the terrible mass of human suffering which is primarily the lot of the afflicted, and in its wake leaves too often privation and destitution the only heritage to their dependants.



